REMARKS

Status of Claims

Claims 6-14, 18, 19, 21-29, 38, 45-48, and 50 are pending.

Claims 22-29, 45-48 and 50 are withdrawn.

Claims 6, 12, 22, 26, and 38 are amended herein.

Claims 52-72 are newly presented (of which claims 60-68 are new-withdrawn).

Claims 7, 8, 13, and 14 are cancelled herein without prejudice.

All claims find support in the specification as originally filed. More specifically, support for "immunogenic" and "antigen elicits an immune response" in claims 6 and 52 is found at least at page 6, line 14 and page 9, lines 5 and 23; support for claims 12 and 26 is found at least at page 9, line 26 through page 10, line 6; support for claim 69 is found at least at page 8, lines 19-22, page 12, lines 10-23, page 14, lines 16-20, and page 23, line 14; support for claim 70 is found at least at page 6, lines 15-18, support for claim 71 is found at least at page 12, lines 14-23; and support for claim 72 is found at least at page 22, lines 27-28.

No new matter is introduced.

Applicant reserves the right to reintroduce cancelled subject matter, for example, in a later-filed continuing application.

Rejection of Claims under 35 U.S.C. §112, 2nd paragraph is Traversed or Rendered Moot

The Office rejected claim 12 as allegedly indefinite for recitation of "OIE list A."

By the present amendment, claim 12 recites "a disease selected from the group consisting of: foot and mouth disease, swine vesicular disease, peste des petits ruminants, lumpy skin disease, bluetongue, African horse sickness, classical swine fever, Newcastle disease, vesicular stomatitis, rinderpest, contagious bovine pleuropneumonia, Rift Valley fever, sheep pox and goat pox, African swine fever, and highly pathogenic avian influenza."

In view of the foregoing amendment and the following remarks, the rejection is traversed or rendered moot.

Rejection of Claims under 35 U.S.C. §102(b) is Traversed or Rendered Moot

The Office rejected claims 6-11, 13, 18, 21, and 38 as allegedly anticipated by Golding *et al.*, Journal of Virology, 69:3299-3307 (1995) ("Golding"). Office Action at page 3. In view of the foregoing amendment and the following remarks, the rejection is traversed or rendered moot.

Claim 6 is amended herein to include the limitation recited in claim 14, namely "the HIV gp120 and the antigen each comprise a polypeptide and both are present in the same polypeptide chain." According to Golding, "gp120 ... was linked to *B. abortus* by first thiolating carbohydrate groups on gp120 and linking those to iodoacetylated *B. abortus* via thioether groups." Golding at page 3300, right column, lines 41-43; emphasis added. Thus, Golding does not anticipate claim 6 and claims, directly or indirectly, dependent therefrom.

Accordingly, Applicants respectfully request that the rejection of claims 6-11, 13, 18, 21, and 38 be withdrawn.

Rejection of Claims under 35 U.S.C. §102(a) is Traversed or Rendered Moot

The Office rejected claims 6-11, 13, 18-19, 21, and 38 as allegedly anticipated by Paoletti *et al.*, J. Infectious Diseases, 186:1597-1602 (2002) ("Paoletti"). Office Action at pages 3-4. In view of the foregoing amendment and the following remarks, the rejection is traversed or rendered moot.

Claim 6 is amended herein to include the limitation recited in claim 14, namely "the HIV gp120 and the antigen each comprise a polypeptide and both are present in the same polypeptide chain." Paoletti discusses a gp120 conjugate with group B streptococcal type III polysaccharide (III). Paoletti at page 1597, Abstract lines 2-3. And as noted by the Office, "Paoletti does not describe ... an antigen on the same polypeptide chain as HIV gp120." Office Action at page 4, lines 21-23. Thus, Paoletti does not anticipate claim 6 and claims, directly or indirectly, dependent therefrom.

Accordingly, Applicants respectfully request that the rejection of claims 6-11, 13, 18-19, 21, and 38 be withdrawn.

Rejection of Claims under 35 U.S.C. §103(a) is Traversed or Rendered Moot

The Office rejected claims 6-14, 18-19, 21, and 38 as allegedly obvious over Paoletti, Engering *et al.*, J. Immunology, 168:2118-2126 (2002) ("Engering"), Kaverin *et al.*, J. General Virology, 83:2497-2505 (2002) ("Kaverin"), and Jin and Wright (Abstract only), Int.

J. Mol. Med., 12:11-16 (2003) ("Jin and Wright"). Office Action at pages 4-5. In view of the foregoing amendment and the following remarks, the rejection is traversed or rendered moot.

According to the Office, "Paoletti does not describe ... an antigen on the same polypeptide chain as HIV gp120." Office Action at page 4, lines 21-23. But the Office states that:

> it would have been obvious ... to combine the teachings above [namely, Paoletti, Engering, Kaverin, and Jin and Wright] and make a HIV gp120 fused to a known antigen. One would have been motivated to do so in order to present a known and characterized antigen from a highly pathogenic virus to a DC leading to the efficient induction of T cell activation by way of DC-SIGN receptor binding (see Engering).

Office Action at page 5, lines 8-9.

Applicant points out that Paoletti "sought to determine whether conjugation methods could improve the immunogenicity of ... (HIV)-1 gp120 ..." Paoletti, Abstract at page 1597, lines 1-2. And as noted above, Paoletti teaches a gp120 conjugate with a polysaccharide, namely group B streptococcal type III polysaccharide (III). Paoletti at page 1597, Abstract lines 2-3; emphasis added. But as noted by the Office, "Paoletti does not describe ... an antigen on the same polypeptide chain as HIV gp120." Moreover, Applicant points out that Paoletti does not teach an immunogenic compound for vaccination of an animal, wherein the antigen is a molecule that elicits an immune response to a disease of the animal. Moreover, Applicant asserts that Paoletti's deficiency as noted by the Office, namely Paoletti's failure to describe "an antigen on the same polypeptide chain as HIV gp120," is not cured by any of the other references relied on by the Office.

For example, regarding Engering, although the reference mentions that "DCs efficiently capture HIV-1 through ... interaction of gp120 with DC-SIGN and mediate subsequent transmission of HIV-1 to T cells," nowhere does Engering disclose an immunogenic compound for vaccination of an animal much less "wherein the HIV gp120 and the antigen each comprise a polypeptide and both are present in the same polypeptide chain" as required by claim 6.

Moreover, regarding Kaverin, the reference discusses antigenic sites on the haemagglutinin molecule of H5 avian influenza virus. But nowhere does Kaverin disclose gp120 or an immunogenic compound for vaccination of an animal much less "wherein the

HIV gp120 and the antigen each comprise a polypeptide and both are present in the same polypeptide chain" as required by claim 6.

Further, regarding Jin and Wright, the abstract relied on by the Office discusses a fusion protein of gp120 with (i) a VSVGTMCT tail that "furnishes an anchor of the chimeric protein"; or (ii) "52 amino acids (aa) from the vector." Jin and Wright, Abstract, lines 6-9. But nowhere does the abstract disclose a gp120 fusion with an antigen much less "wherein the antigen is a molecule that elicits an immune response to a disease of the animal" as required by claim 6.

Moreover, Applicant asserts that the Office has shown neither a "rational underpinning" as required by *KSR* nor any "suggestion," either in the references or in knowledge of those of ordinary skill in the art, to combine Paoletti, Engering, Kaverin, and Jin and Wright.

Applicant points out that the HIV gp120 component of the present invention provides a delivery system for the antigen component of the claimed immunogenic compound. In contrast, Paoletti discloses a conjugate of HIV gp120 with an antigen (namely, group B streptococcal type III polysaccharide (III)) in order to improve the immunogenicity of the gp120 component of the conjugate. Thus, the Office assertion to combine the relied-on references to arrive at Applicant's claimed invention is inapposite to at least the Paoletti disclosure. For example, it appears that the Office contention is that Engering suggests using gp120 to internalize other antigens for presentation to T cells. By contrast, Paoletti use other antigens to enhance the antigenicity of the gp120. Thus, Paoletti and Engering discuss different and contradictory purposes, therefore, the skilled person would not have considered combining these references.

Moreover, Applicant points out that to the extent that Paoletti and Engering relate to improving an immune response in humans (HIV is known as *human* immunodeficiency virus for a reason), even assuming for the sake of argument that one of ordinary skill in the art would be motivated to combine Paoletti with Engering, the skilled person would only have combined HIV gp120 to a human antigen (and not to an antigen that is a molecule associated with a disease of an animal as required in claim 6). This teaches away from the claimed invention since the immunogenic compound of Claims 6 and 52 would not be appropriate for use in humans, and would not act as a marker vaccine in a human.

Further, it appears that the Office has cited Kaverin for disclosing an antigen from a virus causing an animal disease on the OIE list A. Thus, at least because Paoletti and Engering disclose obtaining an immune response in humans, the skilled person would not have combined the teachings of Paoletti and/or Engering with Kaverin. For example, based on Paoletti, the skilled person would have no reason to conjugate HIV gp120 to any antigen associated with a disease of an animal unless that antigen was known to have a carrier activity or the ability to enhance immunogenicity of other antigens. Thus, the skilled person would not have combined the teachings of Paoletti, Engering, and Kaverin.

The present invention provides an antigen delivery system for vaccination of animals which allows discrimination between vaccinated and naturally infected animals. The immunogenic compound of the present invention comprises HIV gp120 and the antigen to be delivered. For example, the HIV gp120 can be processed and presented to T cells such that animals vaccinated with the construct will produce antibodies to gp120-derived peptides. As noted in the specification, since the sequence of HIV gp120 is not naturally present in mammalian genomes, has no known similarity to any other protein in farm or companion animals, and HIV is not a pathogen in any species other than humans, the gp120 can act as a positive marker for discrimination between vaccinated and naturally-infected animals. Such discrimination is of considerable economic importance to agriculture. For example, not being able to distinguish vaccinated animals from infected animals has led certain countries to ban imports of vaccinated animals. Moreover, current vaccination methods lower the market value of meat since carcasses of vaccinated livestock need to be treated as if they were infected, and thus are left to hang for longer to kill any virus that may be present. But none of the cited prior art discuss discriminating between vaccinated and naturally infected animals. None of the cited documents, either alone or in combination, suggest the benefit of using HIV gp120 for this purpose. Indeed, it is only the teachings of the present invention that would motivate a skilled person to make the claimed invention.

At least for these reasons, a *prima facie* obviousness case is negated, accordingly, Applicants respectfully request that the rejection be withdrawn and that the claims be allowed.

CONCLUSIONS

The claims are now in condition for examination and allowance.

If the Office has any questions regarding this submission, the Examiner is invited to contact Applicants' undersigned representative using the information provided below.

Dated:

Respectfully submitted,

By _____

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